



# DEPARTMENT OF THE ARMY

U.S. ARMY COMMUNICATIONS-ELECTRONICS ENGINEERING INSTALLATION AGENCY L FORT HUACHUCA, ARIZONA 85613



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SUBJECT:

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Test Report, Redstone Arsenal AMME-E Acceptance Test (Contract GS-00C-00058) / Publication No / CCC-TED-77-TR-006

Commander

US Army Communications Systems Agency

ATTN: CCM-TT-(H)-TA

Fort Huachuca, Arizona 85613

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JUN 23 1977

# 1. REFERENCES

- a. Contract GS-00C-00058, System Installation Plan for AMME Huntsville Expansion, 15 November 1976.
- b. USACEEIA Publication CCC-TED-TSRC, End of Test Report on the Phase I Redstone AMME System COR Letter T-18, 14 October 1975.
  - DCAC 370-D175-1, DCS AUTODIN Interface and Control Criteria.
  - DCAC 370-D195-1, DCS AUTODIN Interface Category I Testing.
- DCAC 370-D195-2, DCS AUTODIN TEMPEST Category II Testing Requiree. ments.
- f. DCAC 370-D195-3, DCS AUTODIN Category III Operation and Acceptance Testing.
- DCAC 310-D70-30, DCS AUTODIN Switching Center and Tributary Operations.
  - JANAP 128 Automatic Digital Network (AUTODIN) Operating Procedures.
  - i. AR 105-31, Communications-Electronics Message Preparation.
  - USACFEIA Publication ACCC-TED-74-TR-121, 27 March 1974.
  - USACEEIA Publication ACCC-TED-74-TR-146, 27 September 1974.

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#### 2. STATEMENT OF THE TASK.

This report identifies results of the Redstone Arsenal AMME-E acceptance tests. Inducted in accordance with the requirements of Contract GS-00C-00058. Stesting was conducted in accordance with procedures contained in the US Army Automated Multi-media Exchange Test Plan, CDRL Item Number(s) 30 and 32, August 1976, with applicable revisions.

## 3. BACKGROUND.

- a. The AMME Level Automated Telecommunications Center (ATCC) Project is a portion of the Army Telecommunications Automation Program (ATCAP) developed by Commander, US Army Communications Command. The Commander, US Army Communications-Electronics Engineering Installation Agency (USACEIA) was tasked by Commander, US Army Communications Systems Agency (USACSA) (Project Manager) to provide technical and test support for implementation of the AMME Project. The contract required UNIVAC to engineer, furnish, and install (EF&I) an automatic telecommunications system capable of processing and accounting for narrative and data record traffic at several command sites. After implementation of the fifth AMME site at Bailey's Crossroads, VA, Telecommunications Automation Directorate (TAD) of USACEEIA assumed software maintenance responsibilities for existing and future AMME locations.
- b. The AMME is intended to be used as a store and forward switching system, capable of interfacing more than one AUTODIN Switching Center (ASC). Previously installed AMME's have the capability of operating with Interim Remote Terminals (IRT's, and Mode I Terminals in addition to over-the-counter (OTC) service. These sites also have a degraded mode backup capability which provides only OTC operation. Site configurations such as these are described as AMME-Basic installations. The next system level is an AMME-Expanded with dual 9400 processors (system redundancy) to eliminate AMME degraded mode functions. Under ATCAP Program, Redstone Arsenal was the second AMME site to be implemented. Redstone was implemented as an AMME-Basic but due to increasing traffic volume/remote terminals, the system had to be upgraded to an AMME-E. Results of this upgrade are contained in this document.

#### 4. RESPONSIBILITIES.

a. Government Responsibilities. The Government is responsible for the following aspects of the test program:

(1) Review and approve the vendor-submitted test plan and revisions.

(2) Appoint system and subsystem test directors and assistants as required.

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- (3) Conduct acceptance testing in accordance with the terms of the contract.
  - (4) Evaluate system's hardware/software test results.
- (5) Provide contractually-required Government equipment and supplies for the test.
  - (6) Evaluate operator training.
- (7) Conduct additional tests as necessary to demonstrate contractual compliance for specific requirements.
  - b. Vendor Responsibilities. UNIVAC is responsible for the following:
- (1) Deliver on-site, system hardware and documentation in a state which is contractually complaint and ready for Government acceptance testing.
- (2) Notify the Government, in writing, that a complete and successful dry run of all hardware has been conducted using approved test procedures prior to start of acceptance testing.
- (3) Provide technical support, as required, to resolve questions or problems during the test.
  - (4) Provide maintenance support during the test.

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(5) Maintain a complete and accurate record of hardware maintenance, software modifications, and support documentation changes resulting from the test.

#### 5. SUMMARY OF RESULTS.

- a. Completed milestone prior to AMME-E System test. Redstone Phase I hardware installation commenced on 5 January 77. This phase was completed while operating with existing AMME-Basic program. A successful Phase I performance period was concluded on 12 March 1977.
- b. Testing of Redstone AMME-E System commenced on 4 March 1977. During certification of the AMME-E System (Hardware/Software), the existing Degraded Mode Operation (DCT-9000) was used to maintain on-line operation with the AUTODIN Switching Center.
- c. Contractually, Redstone Phase II final hardware installation/reconfiguration was completed on 5 March 1977 except for connecting the DCT 9000 into the AMME-E System. The DCT 9000 was originally scheduled for final

SUBJECT: Test Report, Redstone Arsenal AMME-E Acceptance Test (Contract GS-00C-00058), Publication No. CCC-TED-77-TR-006

configuration on 7 March 1977, but had to be delayed due to hardware/software problems being encountered. Additional time was needed to implement the AMME-E System and a decision was made to continue AMME-E checkout. By extending the test schedule of the AMME-E System, the Degraded Mode operation had to be maintained to process message traffic with AUTODIN ASC.

- d. On 12 March 1977, the DCT 9000 was configured into the AMME System. By reaching this milestone, total AMME-E capabilities were now available to the user command.
- e. Between 14-22 March 1977, USACEEIA test team analyzed and corrected some of the additional software problems found during on-site AMME-E test. Pending software problems not corrected are identified in attached Inclosure 1 of this report.
- f. In accordance with USER command understanding, pending software problems will be analyzed and corrected by USACEEIA-TAD. After these software corrections have been verified by USACEEIA-TED, each correction will be resubmitted to Redstone for implementation. Allotted time frame for correcting these problems should be coordinated between USACEEIA-TAD and USER command.
- g. On-site AMME-E audit was conducted with UNVIAC Customer Engineer. System audit was found correct for Redstone installation. (Attached Inclosure 2 shows results of hardware audit.)

#### 7. CONCLUSIONS.

- a. On 12 March 1977, Redstone AMME-E upgrade was successfully implemented with 13 identified software problems.
- b. The system outage time incurred for implementing this site is considered reasonable. This system outage was caused by the amount of unexpected hardware/software problems found and corrected while working around live traffic conditions. This AMME-fupgrade was more complicated than the initial AMME-Basic installation because:
  - (1) Redstone is live operational site with 19 remote terminals.
- (2) The hardware reconfiguration and software tests required that extreme care be taken not to interfere with live operation (DCT 9000-Degraded Mode Operation).

SUBJECT: Test Report, Redstone Arsenal AMME-E Acceptance Test (Contract GS-00C-00058), Publication No. CCC-TED-77-TR-006

- c. AMME USER command was not prepared to continue testing and stay in degraded mode operation longer than three days (Friday evening, Saturday, and Sunday). After three days of AMME-E testing, direct electrical interface was discontinued to Redstone's 19 remote terminals. This was caused by the extended test period. Also, Redstone Communications Center had only one teletype unit available for preparing outgoing narrative traffic in degraded mode operation.
- d. Software Support Center (SSC) test capabilities are inadequate for evaluating peak traffic conditions for system like Redstone and Letterkenny AMME. It is estimated that a 70 percent checkout is about the best that can be expected from a SSC verification because of: limited remote terminals, program complexity restricts certain SSC tests, simulation of heavy traffic conditions, and simultaneous system activity as demanded by a live AMME site. Improving or degrading speed of certain system functional capabilities could not be clearly determined during SSC checkout. On-site testing proved certain system capabilities had been degraded. Establishment of an average time response for all (major) system functions and comparing these times against new AMME software packages will be required of future SSC (AMME) releases. These type of system comparisons are becoming very visible because of the demand that is placed on the system for message processing at each particular site. More demands of the system capabilities are being made and this is due to the increase of remote terminals and traffic load.
- e. During one of Redstone's heavy traffic periods the AMME-E System was working under the following conditions:
- (1) Around 700-900 messages (100,000 line blocks) scheduled for message transmission.
  - (2) Two Message Entry Positions Active.
  - (3) Nineteen Remote Terminals active.
  - (4) Two traffic manager positions active.

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(5) Both AUTODIN circuits active.

After evaluating the system under the above conditions, it is felt that the AMME-E is close to maximum capability. However, thirteen additional Remote Terminals plus a DPI electrical interface are planned for AMME-E Redstone.

SUBJECT: Test Report, Redstone Arsenal AMME-E Acceptance Test (Contract GS-CCC-00058), Publication No. CCC-TED-77-TR-006

- f. Redstone AMME-E hardware audit was found satisfactory for final system configuration.
- g. Performance and coordination of UNVIAC's on-site representatives (Mr. Smith, Customer Engineer and Mr. Miller, customer support of AMME software) in support of USACEEIA's mission was considered by USACEEIA test director as outstanding.

## 8. RECOMMENDATIONS.

- a. Recommend USACEEIA review thirteen discrepancies identified against AMME-E Redstone and advise USER of USACEEIA corrective action.
- b. Recommend emphasis be placed on obtaining maximum acceptable downtime and appropriate fallback procedures (if required) for future (major) AMME hardware/software upgrades.
- c. Recommend USACEEIA establish what is an acceptable operating time for all (major) AMME functional capabilities during normal (?) and heavy peak conditions (?). Also develop better SSC/On-site AMME test techniques for heavy peak traffic situations. At a minimum, a test will have to be developed that contain 1,000 messages with 100,000 line blocks or more for future system checkouts.
- d. Recommend USACSA scrutinized future increases in remote terminals and message traffic volume for AMME systems to prevent system overload. This action should be maintained until such time as maximum AMME loading capabilities can be determined for normal and peak operating conditions.

FOR THE COMMANDER:

2 Incl

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Colonel, Signal Corps Director, Test and Evaluation Directorate

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REDSTONE AMME-E DISCREPANCIES

RSA AMME-E 001 - 013

DISCREPANCY SHEET		
Test Procedure: Occurred During Test & On-	Discrepancy No: RSA AMME-E-001	
Date: 14 March 1977	Software X	
Location: Redstone Arsenal, Alabama	Hardware Documentation	
Redstone Arsendi, Alaband	Operator Other	
Description of Problem:	Louis:	
AMME Buffer over-run problem.	System runs out of buffers during heavy	
traffic activity. This is an interm		
Corrective Action:	Date:	
VENDOR TEST DIRECTOR	Dan Prado  GOVERNMENT JEST DIRECTOR	
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DISCREPANCY SHEET	
Discovered during on-line status	Discrepancy No: RSA AMME-E-002
Date: 19 March 1977	Software X
Location: Redstone Arsenal, Alabama	Hardware Documentation Operator Other
Description of Problem:	
AMME-E software did not include	alarm notification and double spacing
capabilities for Remote Terminals (I	RT's). These features were in the Redstone
"Basic" AMME.	
Corrective Action:	Date:
VENDOR TEST DIRECTOR	Dan Prado GOVERNMENT TEST DIRECTOR

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DISCREPANCY SHEET	
Discovered during on-line Test Procedure: status	Discrepancy No: RSA AMME-E 003
Date: 16 March 1977	Software x
Location: Redstone Arsenal, Alabama	Hardware Documentation Operator Other
Description of Problem:	
	condition during heavy traffic conditions.
This is an intermittent problem.	
Corrective Action:	Date:
VENDOR TEST DIRECTOR	Dan Prado  GOVERNMENT TEST DIRECTOR

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DISGREPANCY SHEET	
Test Procedure; On-Line Status	Discrepancy No: RSA AMME-E 004
Date: 19 March 1977	Software X
Location:	Hardware Cocumentation Unerator
Description of Problem:	
Intermittent software p	roblem with AMME Restart. When the system has
700-800 message scheduled for	output to remote and over-the-counter device
	red - message duplication occurs. None of these
identical message are marked	"suspected duplicate".
Corrective Action:	Date:
VENDOR TEST DIRECTOR	Dan Prado  GOVERNMENT JEST DIRECTOR

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DISGREPANCY SHEET	
Occurred During Test/On- Test Procedure: Line Status	Discrepancy No: RSA-AMME-E-005
Date: 10 March 1977	Software x
Location:	Hardvare Decumantation
	Uperator Other
Description of Problem:	
	command to force route a message from the
	o the high speed printer (HSP) - extraneous
	e message header pilot and original message
header (FL2).	
Composition	Data
Corrective Action:	Date:
<u> </u>	• .
	Dan Redu
VENDOR TEST DIRECTOR	GOVERNMENT TEST DIRECTOR

HQ CESTA CCC-TEC-TS FM 27-R 15 Sep 75.

DISCREPANC SEVET	
Occurred During Test/On- Test Procedure: Line Status	Discrepancy No: RSA AMME-E-006
Date: 5 March 1977	Software x
Location: Redstone Arsenal, Alabama	Mardware :
	(Unerator
Description of Problem:	
AMME IRT Software handler probl	em. During message header preparation - if
a "BT" is placed on the next to th	e last line of the IRT VDU to indicate the
end of message addressees - the syst	em will go ahead and let the operator
	second page with incorrect formatting.
	fields are reversed and the message has to
	lear this condition. This is a day one
software bug that has never been cor	
Corrective Action:	Date:
	DICT AVAILABLE COPY
	DLM AVAILABLE
	Dan Prade
VEHILOR, TEST DIRECTOR	Dan Prado GOVERNAENT SEST DIRECTOR

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BISCREPANCY SHEET	
,	
Test Procedure: On-Line Status	Discrepancy to: RSA-AMME-E-007
Date: 19 March 1977	Software <sub>X</sub>
Location:Redstone Arsenal, Alabama	Handware :
	Operator Other
Description of Problem:	
Implementation of DCA's TR	C/SPECAT requirement. AMME does not handle
	Format Line 4 for special TRC codes.
	VOOS SIGNING COOV
	BEN AVAILABLE LUFT
Corrective Action:	Date:
	·
	Wan Prado
VENDOR TEST DIRECTOR	GOVERNMENT TEST DIRECTOR

- HQ CEETA CCC-TED-TS FM 27-R

DISCREPANCE SHIEL	The state of the s
Fest Procedure: On-Line Status	Discrepancy No: RSA AMME-E-008
Date: 18 March 1977	Software x
Location: Redstone Arsenal, Alabama	nardware Documentation
Edda Con.	(Uperator
Description of Problem:	# (17 h a.v.
	TDM(-) and being annual bands are
	e IRT(s) are being accepted by the AMME system.
	t are passed through the AMME system and re-
jected by AUTODIN.	
	DEST AVAILABLE CUT!
	La beautiful and the second se
	•
Corrective Action:	Date:
	•
	00
	Han track
VENDOR TEST DIRECTOR	GOVERNMENT TEST DIRECTOR

HQ CLETA GCC-TEG-TS FM 27-R 15 Sep 78 .

SISCHEPARCY SPEED .		
Test Procedure: On-Line Status	Discrepancy No: RSA AMME-E-009	
Date: 17 March 1977	Software .	
Location: Redstone Arsenal, Alabama	Manduare Macymanatics	
	Ugana ton Othan	
Description of Problem:		
Unable to clear message off sys	stem queue. Intermittently messages will	
hung on system "dummy" queue and the	ere is no operational method to clear this	
queue without stopping and restarting	ng the AMME system.	
	DECT AVAILABLE CODY	
	DEDI AVAILABLE COLL	
,		
Corrective Action:	Date:	
	Dan Prado	
VENCOR TEST DIRECTOR	GOVERNMENT TEST DIRECTOR	

HQ CSEIA 000-TED-TS FM 27-R 15 Sep 75

DISCREPANCY SHEET	
Test Procedure:On-Line Status	Discressacy No: RSA AMME-E-010
Date: 18 March 1977	SoftwareX
Location: Redstone Arsenal, Alabama	mardware Pocumentalian
	Unerator Other
Description of Problem:	
AMME Narative Routing Problem	m. During message preparation and multiple
addressees required the same rout:	ing indicator (RI) - this RI is duplicated
twice in format line 2 for transmi	ission. Only one RI is required for this
type of transmission.	
	REST AVAILABLE COPY
	DEDI_AVAILABLE COL
Corrective Action:	Date:
-	
	Dan Prado
VENDOR TEST DIRECTOR	GOVERNMENT TEST DIRECTOR

- HQ CECIA CCC-TED-TS FM 27-R 15 Sep 75

SCHEFFING STEEL	
st Procedure: On-Line Status	Discrepancy No: RSA AMME-E-011
ate: 20 March 1977	Software X
ocation:Redstone Arsenal, Alabama	nardware Decymanyation Uperator Other
escription of Problem:	
	olem. In Transmitting a message with more than ine 2. The system intermittently will reject ions.
	BEST_AVAILABLE COPY
orrective Action:	Date:
VENDOR TEST DIRECTOR	Dan Prado GOVERNMENT TEST DIRECTOR

Mg CLEIA CCC-TED-TS FM 27-R 15 Sep 75.

DISCREPARC SHEET	
Test Procedure: On-Line Status	Discrepancy To: RSA AMME-E-012
Date: 17 March 1977 Location: Redstone Arsenal, Alabama	Software X Hardware Documents: The Control Con
Description of Problem:	
Multiple "#" number signs i	in a Narrative message with cause the system
	BEST AVAILABLE COPY
Corrective Action:	Date:
	•
•	
VEHOUR TEST DIRECTOR	Dan Prado  Ban Prado  GOVERNMENT TEST DIRECTOR

HQ CSSIA CCC-TED-TS FM 27-R 15 Sep 75

DISCREPANCY SHEET	
Test Procedure: On-Line Status	Discrepancy No: RSA AMME-E-013
Date: 20 March 1977	Software X
Location: Redstone Arsenal, Alabama	Hardware : : : : : : : : : : : : : : : : : : :
	Unerator Times:
Description of Problem:	
Operation of present AMME-E s	software indicates at times the system
is near maximum capability under b	neavy traffic loads. Questionable if additional
13 IRT(s) and scheduled DPI can be	e implemented to the system without some kind
of software/hardware modification.	
	- OF CT AMAHADIE CODY
	DEST AVAILABLE CUP!
Corrective Action:	Date:
·	
VENDOR TEST DIRECTOR	Dan Prado  GOVERNMENT TEST DIRECTOR

HQ CEEIA CCC-TCD-TS FM 27-2 15 S-p 75 REDSTONE AMME-E SYSTEM HARDWARE AUDIT

# REDSTONE AMME-E EQUIPMENT INSTALLATION AUDIT 15 MAR 77

MODE	L NO. AND DESCRIPTION	QUANITY ON SITE	INSTALLED	NOTE*
1 :	3019-00 PROCESSOR/CONSOLE	2	2	
2	C1232-02 CONSOLE ASC II Pc WHEEL	2	2	
3	F1093-00 COMMUNICATIONS ADAPTER	2	2	
4	F1092-00 SELECTOR CHANNEL I	2	2	
5	F1092-01 SELECTOR CHANNEL 2	2	2	
6	7010-99 STORAGE 196 K BYTES	2	2	
7	7010-72 STORAGE EXPANSION 196U-262K	2	2	
8	0768-02 PRINTER & CONTROL	1	1	
9	0711-05 CARD READER	1	1	
10	F1177-00 VALIDITY CHECK	1	, <b>1</b>	
11	5017-00 UNISERVO 16 CONTROL	2	2	
12	F0825-00 DUAL CHANNEL	2	2	
13	F0826-00 9 TRACK NRZI	2	2	
14	0862-04 UNISERVO 16	9	9	
15	5024-99 8425 DISC CONTROL	2	2	
16	F1043-00 DUAL CHANNEL	2	2	
17	S425-00 DISC DRIVE	4	4	
18	F2001-00 DUAL ACCESS	4	4	
19	8575-01 LINE TERMINAL CONTROL 16	3	3	
20	D1012-00 DUAL CHANNEL	3	3	
21	F1008-00 LONGITUDINAL REDUNDANCY CHECK	3	. 3	
22	F1005-98 LINE TERMINAL SYNCHRONOUS	41		

NOTE: 26 in use. Additional units are for future remotes.

MOD	EL NO. AND DESCRIPTION	QUANITY	INSTALLED	NOTE*
23	F1002-08 C1 205B (MIL 188)	43	20	
24			14	
25	3542-99 U-200 VDU	7	7	
26	C2045-03 24x80 SCREEN PROTECTED FORMAT	7	7	
27	F1844-08 KEYBOARD	7	7	
28	F2044-01 GENERATOR EXPANSION	7	7	
29	F1245-01 SYNCHRONOUS I/F	7	7	
30	C1468-02 MIL 188 I/F	7	7	
31	F1001-00 9300 CHANNEL ADAPT ER	1	1	
32	3030-00 DCT 9000 III PRINTER/PROCESSOR	1	1	
33	F1104-00 SELECTOR/MUX CHANNEL	1	1	
34	F1097-00 MULTI STROBE READ	1	1	
35	7007-12 STORAGE 16 K BYTES	1	1	
36	0711-00 CARD READER	1	1	
37	0604-00 CARD PUNCH	2	2	
38	F1174-00 EDGE NOTCH	2	2	
39	8573-00 DLT-70 AUTODIN I/F	2	2	
40	F1214-00 DISC PACK	6	6	
41	0920-02 PAPER TAPE CONTROL	1	1	
42	F1033-02 PAPER TAPE READER	1	1	
43	F1100-00 KLEINSCHMIDT READE	1	1	
44	9AB21D JULIAN DATE CLOCK	1	1	
45	2871358 DCM CABLE (50 ft)	7	7	
46	RPQ R 5001-05 MUX CHANNEL SWITCH	4	4	
47	RPQ W2424-00 MUX CHANNEL EXTENSION	2	2	
48	RPQ R5076-00 RED/BLACK INSTALLATION & . CABLES	1	1	

DESCRIPTION OF THE PARTY OF THE

MODEL NO. AND DESCRIPTION	QUANITY ON SITE	INSTALLED	NOTE*			
49 Fl396-00 (tables)	7	7				
50 F1003-99 LINE TERMINAL TELEGRAPH	14	0				
51 F1004-98 LINE TERMINAL ASYNCHRONOUS	5 5	0				
52 F1010-99 ATA 75 BAUD	2	0				
53 F1010-99 ATA 150 BAUD	1	0				
54 F1010-99 ATA 4200 BAUD	2	0				
55 9AB21A VIDEO DISPLAY	7	0				
56 9AF29 CHANNEL SWITCH	1	0				
57 8536-00 CMA TYPE A	1	0				
58 Fl202-00 FIRST MODULE	1	0				
59 F1201-04 CAU/8 BIT MIL 188	1	0 .				
60 2871358 DCM CABLE 10 ft	4	0				
61 2871305 DCM CABLE T CONNECTOR	2	0				
62 RPQ W2351-00 8425 TEMPEST KIT	0	0(1)				
63 RPQ W2409-00 U200 TEMPEST KIT	7	0				
NOTE: (2) V. C. C. C.						

NOTE: (1) Not on site.